綜合試驗有限公司
SOILS & MATERIALS ENGINEERING CO., LTD.
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HKLAS 028

CERTIFICATE OF CALIBRATION

Certificate No.: 14CA0529 01-01 **Page** 1 **of** 2

Item tested

Description:	Sound Level Meter (Type 1)	,	Microphone
Manufacturer:	B & K	,	B & K
Type/Model No.:	2236	,	4188
Serial/Equipment No.:	2100736	,	2157055
Adaptors used:	-	,	-

Item submitted by

Customer Name:	Lam Geotechnics Limited
Address of Customer:	-
Request No.:	-
Date of receipt:	29-May-2014

Date of test: 29-May-2014

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	22-Jun-2014	CIGISMEC
Signal generator	DS 360	33873	09-Apr-2015	CEPREI
Signal generator	DS 360	61227	09-Apr-2015	CEPREI

Ambient conditions

Temperature:	22 ± 1 °C
Relative humidity:	60 ± 10 %
Air pressure:	1000 ± 10 hPa

Test specifications

1, The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 and the lab calibration procedure SMTP004-CA-152.

2, The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of ±20%.

3, The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responsess of the Sound Level Meter.

Test results

This is to certify that the Sound Level Meter conforms to BS 7580: Part 1: 1997 for the conditions under which the test was performed.

Details of the performed measurements are presented on page 2 of this certificate.

Actual Measurement data are documented on worksheets.

Approved Signatory: Huang Jian Min/Feng Jun Qi **Date:** 30-May-2014 **Company Chop:** SOILS AND MATERIALS ENGINEERING COMPANY LTD. 綜合試驗有限公司

Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

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1, Electrical Tests

The electrical tests were perfomed using an equivalent capacitance substituted for the microphone. The results are given in below with test status and the estimated uncertainties. The "Pass" means the result of the test is inside the tolerances stated in the test specifications. The "-" means the result of test is outside these tolerances.

Test:	Subtest:	Status:	Expanded Uncertainty (dB)	Coverage Factor
Self-generated noise	A	Pass	0.3	
	C	Pass	1.0	2.1
	Lin	Pass	2.0	2.2
Linearity range for Leq	At reference range , Step 5 dB at 4 kHz	Pass	0.3	
	Reference SPL on all other ranges	Pass	0.3	
	2 dB below upper limit of each range	Pass	0.3	
	2 dB above lower limit of each range	Pass	0.3	
Linearity range for SPL	At reference range , Step 5 dB at 4 kHz	Pass	0.3	
Frequency weightings	A	Pass	0.3	
	C	Pass	0.3	
	Lin	Pass	0.3	
Time weightings	Single Burst Fast	Pass	0.3	
	Single Burst Slow	Pass	0.3	
Peak response	Single 100μs rectangular pulse	Pass	0.3	
R.M.S. accuracy	Crest factor of 3	Pass	0.3	
Time weighting I	Single burst 5 ms at 2000 Hz	Pass	0.3	
	Repeated at frequency of 100 Hz	Pass	0.3	
Time averaging	1 ms burst duty factor $1/10^3$ at 4kHz	Pass	0.3	
	1 ms burst duty factor $1/10^4$ at 4kHz	Pass	0.3	
Pulse range	Single burst 10 ms at 4 kHz	Pass	0.4	
Sound exposure level	Single burst 10 ms at 4 kHz	Pass	0.4	
Overload indication	SPL	Pass	0.3	
	Leq	Pass	0.4	

2, Acoustic tests

The complete sound level meter was calibrated on the reference range using a B&K 4226 acoustic calibrator with 1000Hz and SPL 94 dB. The sensitivity of the sound level meter was adjusted. The test result at 125 Hz and 8000 Hz are given in below with test status and the estimated uncertainties.

Test:	Subtest	Status	Expanded Uncertainty (dB)	Coverage Factor
Acoustic response	Weighting A at 125 Hz	Pass	0.3	
	Weighting A at 8000 Hz	Pass	0.5	

3, Response to associated sound calibrator

N/A

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

- End -

Calibrated by: Fung Chi Yip **Date:** 29-May-2014

Checked by: Lam Tze Wai **Date:** 30-May-2014

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

綜合試驗有限公司
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HOKLAS 028

CERTIFICATE OF CALIBRATION

Certificate No.: 14CA0529 01-02 **Page:** 1 **of** 2

Item tested

Description:	Acoustical Calibrator (Class 1)
Manufacturer:	Rion Co., Ltd.
Type/Model No.:	NC-73
Serial/Equipment No.:	10465798
Adaptors used:	-

Item submitted by

Curstomer:	Lam Geotechnics Limited
Address of Customer:	-
Request No.:	-
Date of receipt:	29-May-2014

Date of test: 30-May-2014

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2412857	13-May-2015	SCL
Preamplifier	B&K 2673	2239857	10-Apr-2015	CEPREI
Measuring amplifier	B&K 2610	2346941	08-Apr-2015	CEPREI
Signal generator	DS 360	61227	09-Apr-2015	CEPREI
Digital multi-meter	34401A	US36087050	17-Dec-2014	CEPREI
Audio analyzer	8903B	GB41300350	07-Apr-2015	CEPREI
Universal counter	53132A	MY40003662	11-Apr-2015	CEPREI

Ambient conditions

Temperature:	22 ± 1 °C
Relative humidity:	60 ± 10 %
Air pressure:	1000 ± 10 hPa

Test specifications

1, The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.

2, The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.

3, The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

Test results

Details of the performed measurements are presented on **page 2** of this certificate.

Approved Signatory: Huang Jian Min/Feng Jun Qi **Date:** 30-May-2014 **Company Chop:** SOILS & MATERIALS ENGINEERING COMPANY LTD 綜合試驗有限公司

Comments: The results reported in this certificate refer to the conditon of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

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CERTIFICATE OF CALIBRATION

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1, Measured Sound Pressure Level

The output Sound Pressure Level in the calibrator head was measured at the setting and frequency shown using a calibrated laboratory standard microphone and insert voltage technique. The results are given in below with the estimated uncertainties.

(Output level in dB re 20 μPa)

Frequency Shown Hz	Output Sound Pressure Level Setting dB	Measured Output Sound Pressure Level dB	Estimated Expanded Uncertainty dB
1000	94.00	94.57	0.10

2, Sound Pressure Level Stability - Short Term Fluctuations

The Short Term Fluctuations was determined by measuring the maximum and minimum of the fast weighted DC output of the B&K 2610 measuring amplifier over a 20 second time interval as required in the standard. The Short Term Fluctuation was found to be:

At 1000 Hz **STF = 0.001 dB**

Estimated expanded uncertainty 0.005 dB

3, Actual Output Frequency

The determination of actual output frequency was made using a B&K 4180 microphone together with a B&K 2673 preamplifier connected to a B&K 2610 measuring amplifier. The AC output of the B&K 2610 was taken to an universal counter which was used to determine the frequency averaged over 20 second of operation as required by the standard. The actual output frequency at 1 KHz was:

At 1000 Hz **Actual Frequency = 965.6 Hz**

Estimated expanded uncertainty 0.1 Hz Coverage factor k = 2.2

4, Total Noise and Distortion

For the Total Noise and Distortion measurement, the unfiltered AC output of the B&K 2610 measuring amplifier was connected to an Agilent Type 8903 B distortion analyser. The TND result at 1 KHz was:

At 1000 Hz **TND = 0.9 %**

Estimated expanded uncertainty 0.7 %

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

- End -

Calibrated by: Fung Chi Yip **Date:** 30-May-2014

Checked by: Lam Tze Wai **Date:** 30-May-2014

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

TISCH Environmental

TISCH ENVIRONMENTAL, INC.
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ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Jul 14, 2014 Rootsmeter S/N 0438320 Ta (K) - 298
Operator Tisch Orifice I.D. - 0005 Pa (mm) - 749.3

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1	NA	NA	1.00	1.3870	3.2	2.00
2	NA	NA	1.00	0.9830	6.4	4.00
3	NA	NA	1.00	0.8760	7.9	5.00
4	NA	NA	1.00	0.8340	8.8	5.50
5	NA	NA	1.00	0.6860	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)		Va	(x axis) Qa	(y axis)
0.9817	0.7078	1.4042		0.9957	0.7179	0.8919
0.9775	0.9944	1.9859		0.9915	1.0086	1.2613
0.9754	1.1135	2.2203		0.9894	1.1294	1.4101
0.9743	1.1683	2.3286		0.9882	1.1849	1.4790
0.9692	1.4128	2.8084		0.9830	1.4330	1.7837
Qstd slope (m) =		1.99175		Qa slope (m) =		1.24720
intercept (b) =		-0.00041		intercept (b) =		-0.00026
coefficient (r) =		0.99991		coefficient (r) =		0.99991
y axis = SQRT[H2O(Pa/760)(298/Ta)]				y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

Vstd = Diff. Vol[(Pa-Diff. Hg)/760](298/Ta)
Qstd = Vstd/Time

Va = Diff Vol [(Pa-Diff Hg)/Pa]
Qa = Va/Time

For subsequent flow rate calculations:

Qstd = 1/m{[SQRT(H2O(Pa/760)(298/Ta))]- b}
Qa = 1/m{[SQRT H2O(Ta/Pa)]- b}

Lam Geotechincs Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location	:	CMA1b	**Calbration Date**	:	2-Jul-14
Equipment no.	:	EL452	**Calbration Due Dat**	:	2-Sep-14

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition				
Temperature, T_a	302 Kelvin	**Pressure, P_a**	1009	mmHg

Orifice Transfer Standard Information					
Equipment No.	**EL086**	**Slope, m_c**	2.01968	**Intercept, bc**	-0.02746
Last Calibration Date	15-Jul-13	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$			
Next Calibration Date	15-Jul-14	$= m_c \times Q_{std} + b_c$			

Calibration of TSP						
Calibration Point	**Manometer Reading H (inches of water)**			**Q_{std}** (m^3 / min.) **X-axis**	**Continuous Flow Recorder, W** (CFM)	**IC** $(W(P_a/1013.3x298/T_a)^{1/2}/35.31)$ **Y-axis**
	(up)	(down)	(difference)			
1	6.3	6.3	12.6	1.7557	60	59.4747
2	5.0	5.0	10.0	1.5656	49	48.5710
3	4.0	4.0	8.0	1.4018	40	39.6498
4	2.7	2.7	5.4	1.1541	26	25.7724
5	1.2	1.2	2.4	0.7739	12	11.8949

By Linear Regression of Y on X

Slope, m = 48.8251 Intercept, b = -27.8761

Correlation Coefficient* = 0.9947

Calibration Accepted = Yes/~~No~~**

* if Correlation Coefficient < 0.990, check and recalibration again.

** Delete as appropriate.

Remarks : _____

Calibrated by	:	Henry Lau	**Checked by**	:	Pauline Wong
Date	:	2-Jul-14	**Date**	:	2-Jul-14

Lam Geotechincs Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location	:	CMA2a	**Calbration Date**	:	2-Jul-14
Equipment no.	:	EL449	**Calbration Due Dat**	:	2-Sep-14

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition					
Temperature, T_a	302	Kelvin	**Pressure, P_a**	1009	mmHg

Orifice Transfer Standard Information					
Equipment No.	**EL086**	**Slope, m_c**	2.01968	**Intercept, bc**	-0.02746
Last Calibration Date	15-Jul-13	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$			
Next Calibration Date	15-Jul-14	$= m_c \times Q_{std} + b_c$			

Calibration of TSP

Calibration Point	**Manometer Reading H (inches of water)** (up)	(down)	(difference)	**Q_{std}** (m^3 / min.) **X-axis**	**Continuous Flow Recorder, W** (CFM)	**IC** $(W(P_a/1013.3 \times 298/T_a)^{1/2}/35.31)$ **Y-axis**
1	6.1	6.1	12.2	1.7279	60	59.4747
2	4.7	4.7	9.4	1.5183	54	53.5273
3	3.7	3.7	7.4	1.3487	48	47.5798
4	2.3	2.3	4.6	1.0662	40	39.6498
5	1.4	1.4	2.8	0.8349	30	29.7374

By Linear Regression of Y on X

Slope, m	=	32.7993	Intercept, b	=	3.3810
Correlation Coefficient*	=	0.9971			
Calibration Accepted	=	Yes/~~No~~**			

* if Correlation Coefficient < 0.990, check and recalibration again.

** Delete as appropriate.

Remarks : _____

Calibrated by	:	Henry Lau	**Checked by**	:	Pauline Wong
Date	:	2-Jul-14	**Date**	:	2-Jul-14

Lam Geotechincs Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location	:	CMA3a	**Calbration Date**	:	21-Jun-14
Equipment no.	:	EL333	**Calbration Due Dat**	:	21-Aug-14

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition					
Temperature, T_a	301	Kelvin	**Pressure, P_a**	1003	mmHg

Orifice Transfer Standard Information					
Equipment No.	**EL086**	**Slope, m_c**	2.01968	**Intercept, bc**	-0.02746
Last Calibration Date	15-Jul-13	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$			
Next Calibration Date	15-Jul-14	$= m_c \times Q_{std} + b_c$			

Calibration of TSP						
Calibration Point	**Manometer Reading H (inches of water)**			**Q_{std}** (m^3 / min.)	**Continuous Flow Recorder, W**	**IC** $(W(P_a/1013.3x298/T_a)^{1/2}/35.31)$
	(up)	(down)	(difference)	**X-axis**	(CFM)	**Y-axis**
1	5.5	5.5	11.0	1.6392	61	60.3860
2	4.4	4.4	8.8	1.4676	52	51.4766
3	3.7	3.7	7.4	1.3469	43	42.5672
4	2.4	2.4	4.8	1.0874	26	25.7383
5	1.5	1.5	3.0	0.8626	14	13.8591

By Linear Regression of Y on X

Slope, m = 61.3367 Intercept, b = -39.7515

Correlation Coefficient* = 0.9987

Calibration Accepted = Yes/~~No~~**

* if Correlation Coefficient < 0.990, check and recalibration again.

** Delete as appropriate.

Remarks : _____

Calibrated by	:	Felix Li	**Checked by**	:	Pauline Wong
Date	:	21-Jun-14	**Date**	:	21-Jun-14

Lam Geotechincs Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location	:	CMA3a	**Calbration Date**	:	22-Aug-14
Equipment no.	:	EL333	**Calbration Due Dat**	:	22-Oct-14

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition					
Temperature, T_a	303	Kelvin	**Pressure, P_a**	1009	mmHg

Orifice Transfer Standard Information					
Equipment No.	**EL086**	**Slope, m_c**	1.99175	**Intercept, bc**	-0.00041
Last Calibration Date	14-Jul-14	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$			
Next Calibration Date	14-Jul-15	$= m_c \times Q_{std} + b_c$			

Calibration of TSP						
Calibration Point	**Manometer Reading H (inches of water)**			**Q_{std}** (m^3 / min.)	**Continuous Flow Recorder, W**	**IC** $(W(P_a/1013.3x298/T_a)^{1/2}/35.31)$
	(up)	(down)	(difference)	**X-axis**	(CFM)	**Y-axis**
1	5.6	5.6	11.2	1.6630	62	61.3557
2	4.3	4.3	8.6	1.4573	51	50.4700
3	3.8	3.8	7.6	1.3699	44	43.5428
4	2.5	2.5	5.0	1.1112	27	26.7194
5	1.4	1.4	2.8	0.8316	15	14.8441

By Linear Regression of Y on X

Slope, m	=	57.5058	Intercept, b	=	-34.6006
Correlation Coefficient*	=	0.9959			
Calibration Accepted	=	Yes/~~No~~**			

* if Correlation Coefficient < 0.990, check and recalibration again.

** Delete as appropriate.

Remarks : _____

Calibrated by	:	Felix Li	**Checked by**	:	Pauline Wong
Date	:	22-Aug-14	**Date**	:	22-Aug-14

Lam Geotechincs Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location	:	CMA4a	**Calbration Date**	:	2-Jul-14
Equipment no.	:	EL390	**Calbration Due Dat**	:	2-Sep-14

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition					
Temperature, T_a	302	Kelvin	**Pressure, P_a**	1009	mmHg

Orifice Transfer Standard Information					
Equipment No.	**EL086**	**Slope, m_c**	2.01968	**Intercept, bc**	-0.02746
Last Calibration Date	15-Jul-13	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$			
Next Calibration Date	15-Jul-14	$= m_c \times Q_{std} + b_c$			

Calibration of TSP

Calibration Point	**Manometer Reading H (inches of water)** (up)	(down)	(difference)	**Q_{std}** (m^3 / min.) **X-axis**	**Continuous Flow Recorder, W** (CFM)	**IC** ($W(P_a/1013.3 \times 298/T_a)^{1/2}/35.31$) **Y-axis**
1	6.2	6.2	12.4	1.7419	60	59.4747
2	5.3	5.3	10.6	1.6115	52	51.5448
3	4.1	4.1	8.2	1.4190	43	42.6236
4	2.7	2.7	5.4	1.1541	24	23.7899
5	1.4	1.4	2.8	0.8349	12	11.8949

By Linear Regression of Y on X

Slope, m	=	53.7477	Intercept, b	=	-34.8156
Correlation Coefficient*	=	0.9945			
Calibration Accepted	=	Yes/~~No~~**			

* if Correlation Coefficient < 0.990, check and recalibration again.

** Delete as appropriate.

Remarks : _____

Calibrated by	:	Felix Li	**Checked by**	:	Pauline Wong
Date	:	2-Jul-14	**Date**	:	2-Jul-14

Lam Geotechincs Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location	:	CMA5a	**Calbration Date**	:	21-Jun-14
Equipment no.	:	EL380	**Calbration Due Dat**	:	21-Aug-14

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition					
Temperature, T_a	301	Kelvin	**Pressure, P_a**	1003	mmHg

Orifice Transfer Standard Information					
Equipment No.	**EL086**	**Slope, m_c**	2.01968	**Intercept, bc**	-0.02746
Last Calibration Date	15-Jul-13	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$			
Next Calibration Date	15-Jul-14	$= m_c \times Q_{std} + b_c$			

Calibration of TSP						
Calibration Point	**Manometer Reading H (inches of water)**			**Q_{std}** (m^3 / min.) **X-axis**	**Continuous Flow Recorder, W** (CFM)	**IC** $(W(P_a/1013.3x298/T_a)^{1/2}/35.31)$ **Y-axis**
	(up)	(down)	(difference)			
1	5.6	5.6	11.2	1.6539	61	60.3860
2	4.8	4.8	9.6	1.5323	52	51.4766
3	3.5	3.5	7.0	1.3104	42	41.5772
4	2.3	2.3	4.6	1.0648	26	25.7383
5	1.2	1.2	2.4	0.7729	13	12.8691

By Linear Regression of Y on X

Slope, m = 53.8279 Intercept, b = -29.7835

Correlation Coefficient* = 0.9974

Calibration Accepted = Yes/~~No~~**

* if Correlation Coefficient < 0.990, check and recalibration again.

** Delete as appropriate.

Remarks : _____

Calibrated by	:	Felix Li	**Checked by**	:	Pauline Wong
Date	:	21-Jun-14	**Date**	:	21-Jun-14

Lam Geotechincs Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location	:	CMA5a	**Calbration Date**	:	22-Aug-14
Equipment no.	:	EL380	**Calbration Due Dat**	:	22-Oct-14

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition					
Temperature, T_a	303	Kelvin	**Pressure, P_a**	1009	mmHg

Orifice Transfer Standard Information					
Equipment No.	**EL086**	**Slope, m_c**	1.99175	**Intercept, bc**	-0.00041
Last Calibration Date	14-Jul-14	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$			
Next Calibration Date	14-Jul-15	$= m_c \times Q_{std} + b_c$			

Calibration of TSP						
Calibration Point	**Manometer Reading H (inches of water)**			**Q_{std}** (m^3 / min.) **X-axis**	**Continuous Flow Recorder, W** (CFM)	**IC** $(W(P_a/1013.3x298/T_a)^{1/2}/35.31)$ **Y-axis**
	(up)	(down)	(difference)			
1	5.8	5.8	11.6	1.6924	60	59.3765
2	4.7	4.7	9.4	1.5235	54	53.4389
3	3.6	3.6	7.2	1.3334	41	40.5739
4	2.4	2.4	4.8	1.0888	28	27.7090
5	1.3	1.3	2.6	0.8014	15	14.8441

By Linear Regression of Y on X

Slope, m	=	51.6826	Intercept, b	=	-27.3733
Correlation Coefficient*	=	0.9971			
Calibration Accepted	=	Yes/~~No~~**			

* if Correlation Coefficient < 0.990, check and recalibration again.

** Delete as appropriate.

Remarks : _____

Calibrated by	:	Felix Li	**Checked by**	:	Pauline Wong
Date	:	22-Aug-14	**Date**	:	22-Aug-14

Lam Geotechincs Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location	:	MA1e	**Calbration Date**	:	21-Jun-14
Equipment no.	:	EL455	**Calbration Due Dat**	:	21-Aug-14

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition					
Temperature, T_a	301	Kelvin	**Pressure, P_a**	1003	mmHg

Orifice Transfer Standard Information					
Equipment No.	**EL086**	**Slope, m_c**	2.01968	**Intercept, bc**	-0.02746
Last Calibration Date	15-Jul-13	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$			
Next Calibration Date	15-Jul-14	$= m_c \times Q_{std} + b_c$			

Calibration of TSP						
Calibration Point	**Manometer Reading H (inches of water)**			**Q_{std}** (m^3 / min.) **X-axis**	**Continuous Flow Recorder, W** (CFM)	**IC** $(W(P_a/1013.3x298/T_a)^{1/2}/35.31)$ **Y-axis**
	(up)	(down)	(difference)			
1	6.5	6.5	13.0	1.7808	57	56.4262
2	4.2	4.2	8.4	1.4342	48	47.5168
3	3.3	3.3	6.6	1.2728	42	41.5772
4	2.1	2.1	4.2	1.0181	32	31.6779
5	1.4	1.4	2.8	0.8338	28	27.7182

By Linear Regression of Y on X

Slope, m = 31.5589 Intercept, b = 0.9687

Correlation Coefficient* = 0.9958

Calibration Accepted = Yes/~~No~~**

* if Correlation Coefficient < 0.990, check and recalibration again.

** Delete as appropriate.

Remarks : _____

Calibrated by	:	Felix Li	**Checked by**	:	Pauline Wong
Date	:	21-Jun-14	**Date**	:	21-Jun-14

Lam Geotechincs Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location	:	MA1e	**Calbration Date**	:	22-Aug-14
Equipment no.	:	EL455	**Calbration Due Dat**	:	22-Oct-14

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition					
Temperature, T_a	303	Kelvin	**Pressure, P_a**	1009	mmHg

Orifice Transfer Standard Information					
Equipment No.	**EL086**	**Slope, m_c**	1.99175	**Intercept, bc**	-0.00041
Last Calibration Date	14-Jul-14	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$			
Next Calibration Date	14-Jul-15	$= m_c \times Q_{std} + b_c$			

Calibration of TSP						
Calibration Point	**Manometer Reading H (inches of water)**			**Q_{std}** (m^3 / min.) **X-axis**	**Continuous Flow Recorder, W** (CFM)	**IC** $(W(P_a/1013.3 \times 298/T_a)^{1/2}/35.31)$ **Y-axis**
	(up)	(down)	(difference)			
1	6.4	6.4	12.8	1.7778	59	58.3869
2	4.0	4.0	8.0	1.4055	46	45.5220
3	3.5	3.5	7.0	1.3148	43	42.5532
4	2.3	2.3	4.6	1.0658	33	32.6571
5	1.6	1.6	3.2	0.8890	27	26.7194

By Linear Regression of Y on X

Slope, m = 35.9395 Intercept, b = -5.2153

Correlation Coefficient* = 0.9995

Calibration Accepted = Yes/~~No~~**

* if Correlation Coefficient < 0.990, check and recalibration again.

** Delete as appropriate.

Remarks : _____

Calibrated by	:	Felix Li	**Checked by**	:	Pauline Wong
Date	:	22-Aug-14	**Date**	:	22-Aug-14

Lam Geotechincs Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location	:	MA1w	**Calbration Date**	:	21-Jun-14
Equipment no.	:	EL080	**Calbration Due Dat**	:	21-Aug-14

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition					
Temperature, T_a	301	Kelvin	**Pressure, P_a**	1003	mmHg

Orifice Transfer Standard Information					
Equipment No.	**EL086**	**Slope, m_c**	2.01968	**Intercept, bc**	-0.02746
Last Calibration Date	15-Jul-13	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$			
Next Calibration Date	15-Jul-14	$= m_c \times Q_{std} + b_c$			

Calibration of TSP						
Calibration Point	**Manometer Reading H (inches of water)**			**Q_{std}** (m^3 / min.)	**Continuous Flow Recorder, W**	**IC** $(W(P_a/1013.3 \times 298/T_a)^{1/2}/35.31)$
	(up)	(down)	(difference)	**X-axis**	(CFM)	**Y-axis**
1	6.3	6.3	12.6	1.7534	53	52.4665
2	5.1	5.1	10.2	1.5790	48	47.5168
3	4.2	4.2	8.4	1.4342	40	39.5974
4	2.6	2.6	5.2	1.1313	30	29.6980
5	1.8	1.8	3.6	0.9436	24	23.7584

By Linear Regression of Y on X

Slope, m	=	36.2029	Intercept, b	=	-10.9288
Correlation Coefficient*	=	0.9965			
Calibration Accepted	=	Yes/~~No~~**			

* if Correlation Coefficient < 0.990, check and recalibration again.

** Delete as appropriate.

Remarks : _____

Calibrated by	:	Felix Li	**Checked by**	:	Pauline Wong
Date	:	21-Jun-14	**Date**	:	21-Jun-14

Lam Geotechincs Limited

Calibration Data for High Volume Sampler (TSP Sampler)

Location	:	MA1w	**Calbration Date**	:	22-Aug-14
Equipment no.	:	EL080	**Calbration Due Dat**	:	22-Oct-14

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition					
Temperature, T_a	303	Kelvin	**Pressure, P_a**	1009	mmHg

Orifice Transfer Standard Information					
Equipment No.	**EL086**	**Slope, m_c**	1.99175	**Intercept, bc**	-0.00041
Last Calibration Date	14-Jul-14	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$			
Next Calibration Date	14-Jul-15	$= m_c \times Q_{std} + b_c$			

Calibration of TSP						
Calibration Point	**Manometer Reading H (inches of water)**			**Q_{std}** (m^3 / min.)	**Continuous Flow Recorder, W**	**IC** $(W(P_a/1013.3x298/T_a)^{1/2}/35.31)$
	(up)	(down)	(difference)	**X-axis**	(CFM)	**Y-axis**
1	6.5	6.5	13.0	1.7916	54	53.4389
2	5.3	5.3	10.6	1.6178	47	46.5116
3	4.4	4.4	8.8	1.4741	42	41.5636
4	2.6	2.6	5.2	1.1332	32	31.6675
5	2.1	2.1	4.2	1.0185	29	28.6986

By Linear Regression of Y on X

Slope, m	=	31.5000	Intercept, b	=	-3.9461
Correlation Coefficient*	=	0.9972			
Calibration Accepted	=	Yes/~~No~~**			

* if Correlation Coefficient < 0.990, check and recalibration again.

** Delete as appropriate.

Remarks : _____

Calibrated by	:	Felix Li	**Checked by**	:	Pauline Wong
Date	:	22-Aug-14	**Date**	:	22-Aug-14